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Measurement of quenching factor for NaI(Tl) scintillation crystal

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Measurements of the quenching factor for sodium and iodine recoils in a small (2 cm x 2 cm x 1.5 cm) NaI(Tl) crystal have been performed with 2.48 MeV mono-energetic neutrons generated from D-D fusion. The crystal was made from the same Alpha Spectra-grown ingot as a large crystal used for KIMS-NaI experiment. BC501a liquid scintillators are installed in various angles to tag neutrons that scatter off sodium or iodine nuclei. Depending on the scattering angle of the neutron, energies of recoiled ions range from 10 to 100 keVnr for sodium and 10 to 75 keVnr for iodine. Quenching factors of sodium are measured at 4 points and those range from 14% to 20% and those of iodine are measured at 5 points and those range from 5~7%. Additional measurement in lower recoil energy regions for sodium is planned.

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